

# Using Technology for More Frequent and Better Data Collection



World Bank - Poverty & Equity Global Practice  
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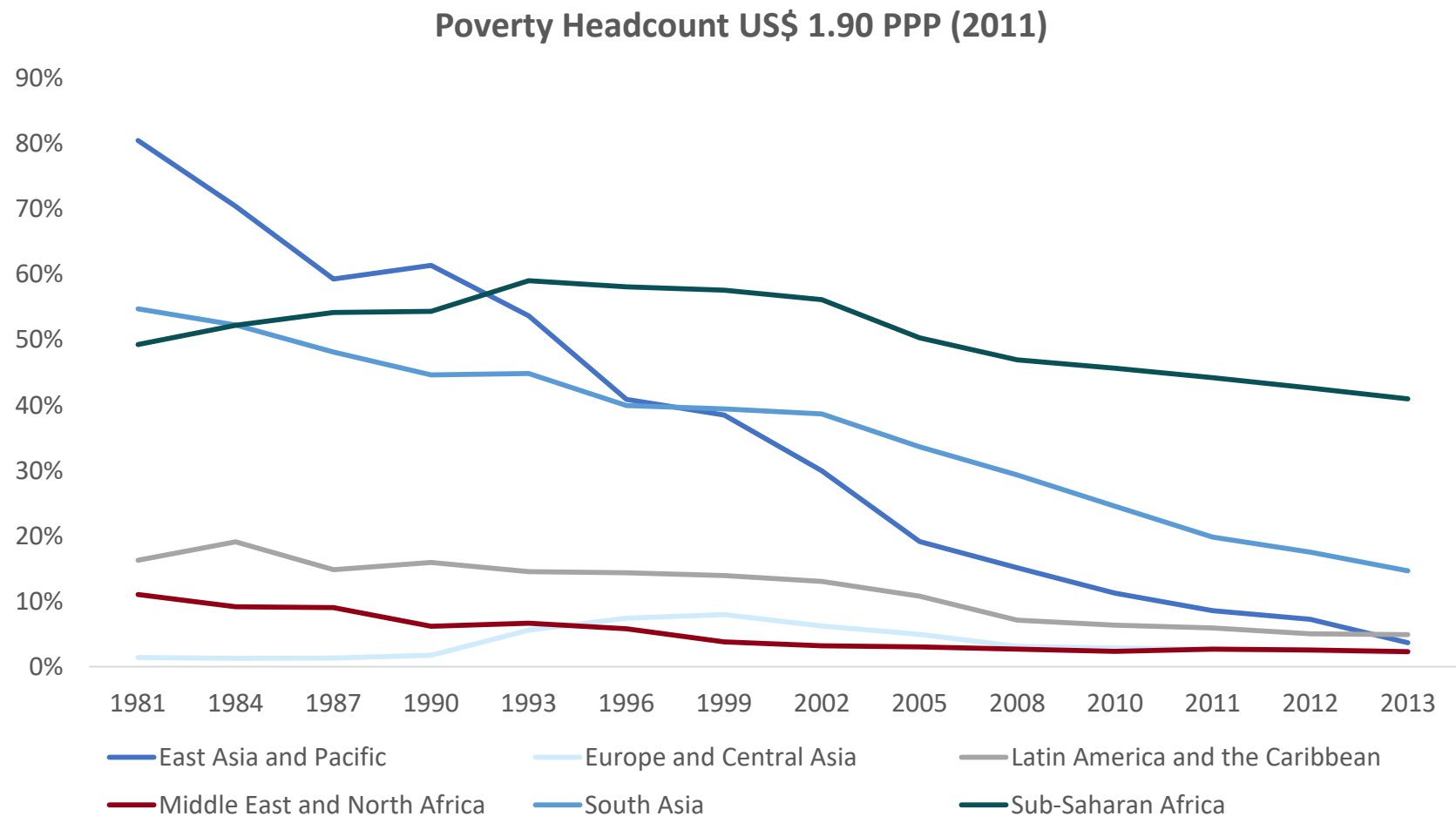
Utz Pape

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To monitor progress to SDG 1 (no poverty), we need to measure poverty timely, accurately and frequently.



Even though the MENA region has managed to keep poverty low, frequent monitoring is important to ensure further progress.



Povcalnet, February (2018)

# Tablets, improved mobile phone coverage and cloud computing are changing the way and frequency we can measure poverty.



- Tablets allow us to collect data electronically, with better quality and more timely.



- Improved mobile phone coverage gives us the opportunity to use mobile phone interviews instead of face-to-face interviews to collect data.




- Cloud computing and improvement of statistical learning algorithms enables us to process satellite images and other sources of big data.

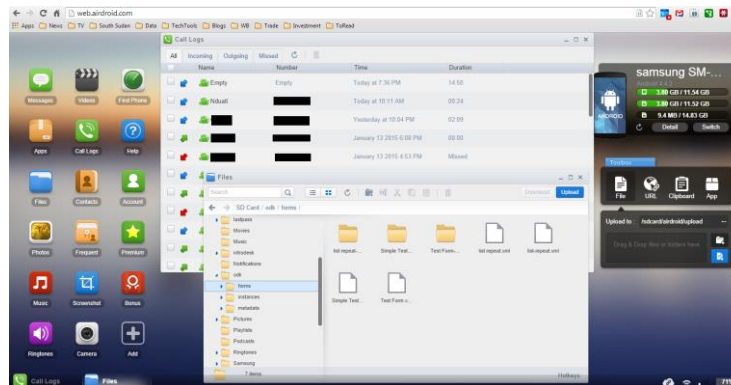
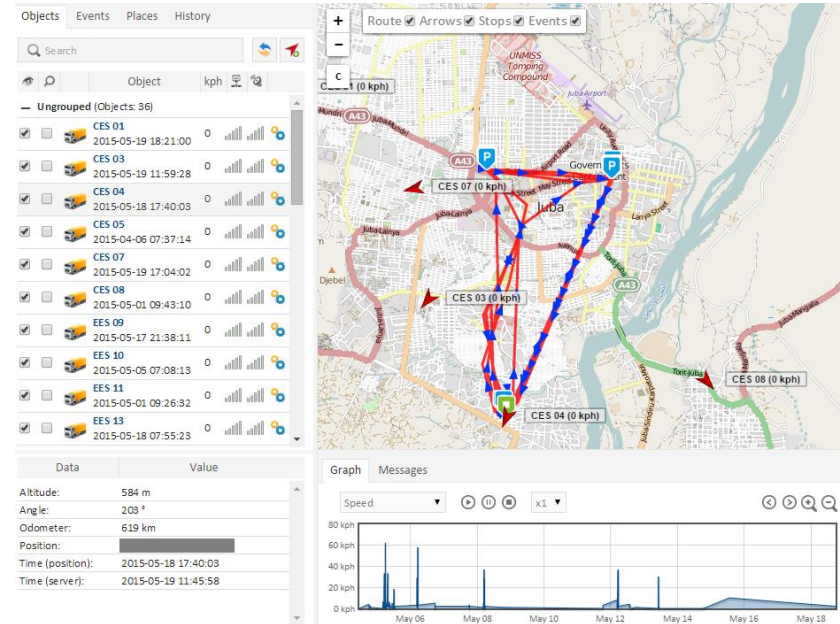
**Using technology to get better data more frequently, also in the event of shocks.**





# Computer-Assisted-Personal-Interview (CAPI) opens new avenues for quality assurance and control.

- Dynamic validation patterns.
- Complex and random skipping patterns.
- Barcode scanning
- Monitor GPS location.
- Random sound bites. 
- Real-time data quality control.
- Multi-media information.
- Remote tablet management.





# Tablets can be used to capture videos.

## An example: Video testimonials to give voice to the poor.

In South Sudan, the video testimonials ensure that policy makers cannot ignore the suffering of the people.

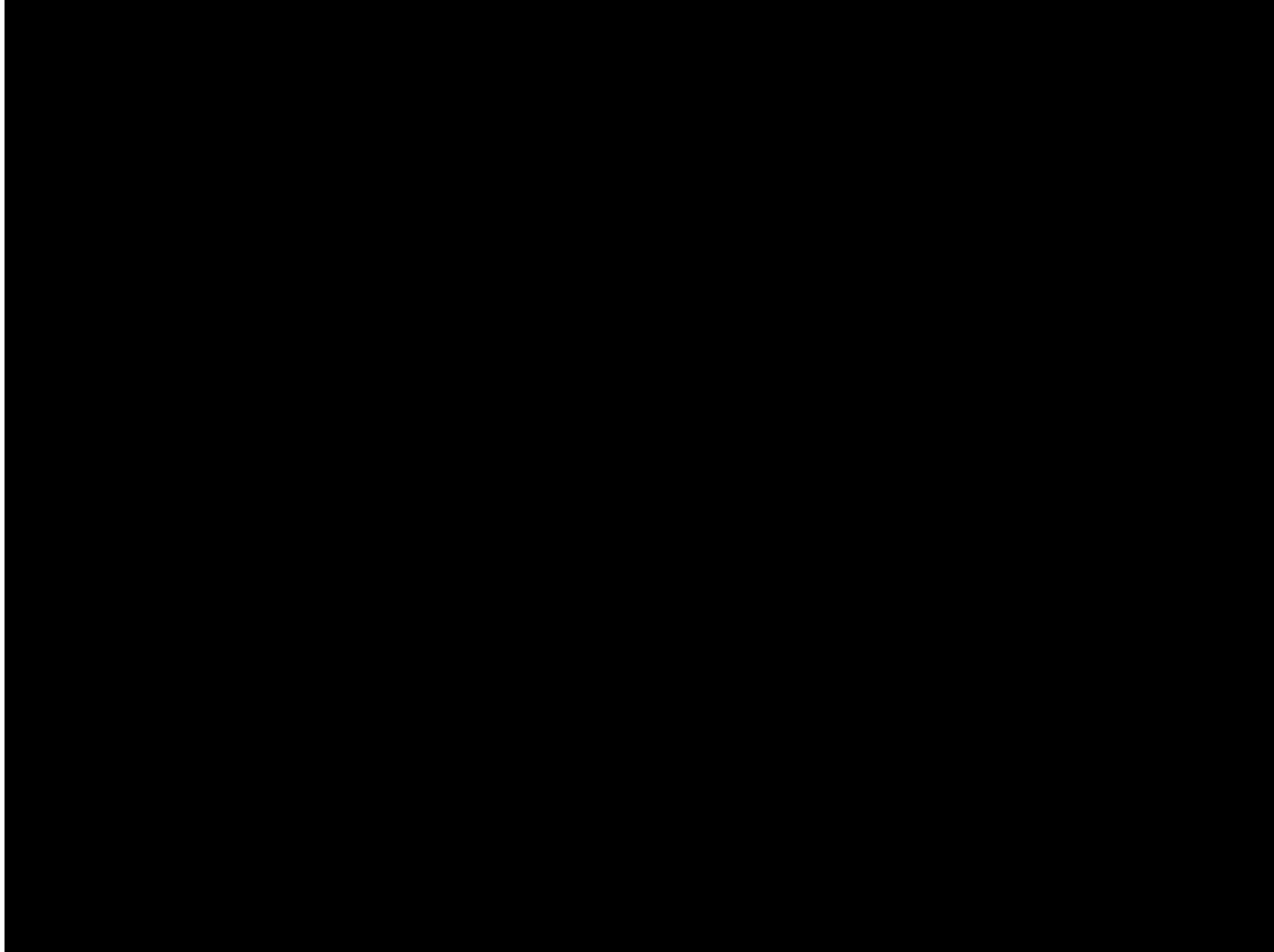
- Enumerators are trained by journalists to use the tablet with a tripod and micro-phone to record voluntary video testimonials.
- Testimonials are collected as part of a representative household survey at marginal extra cost.
- Testimonials are strictly voluntary with informed consent.
- Respondents see testimonials as a way to voice their concerns, and to express themselves after a long structured questionnaire that sometimes can feel alien to their real suffering.
- Video testimonials are edited and sub-titled before being published on the website.
- In addition to giving voice to the poor, the testimonials add a subjective dimension to the - often 'dry' - quantitative statistics.





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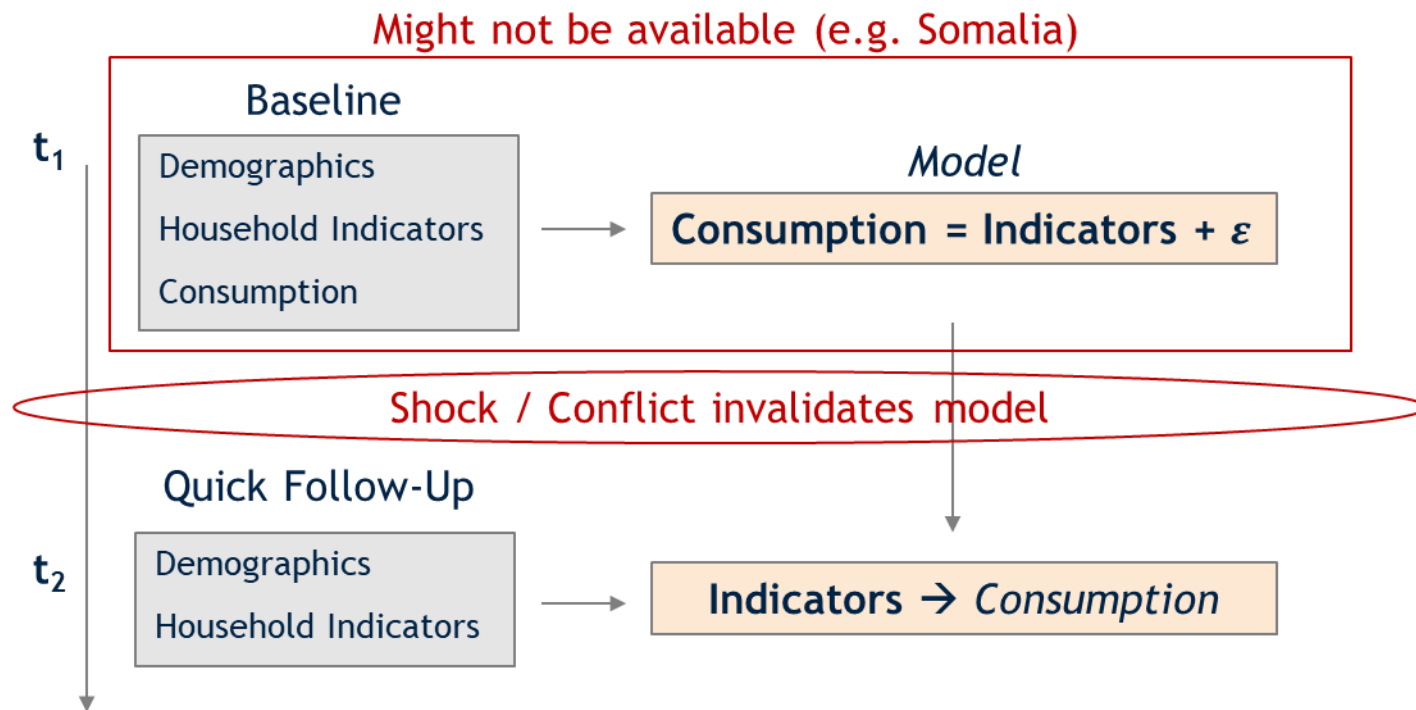




# Complex skipping patterns can be utilized for randomization.

## An example: Measuring Poverty in 60 Minutes.

- Traditional consumption surveys take many hours to administer. Such lengthy interviews can be impossible (like in Somalia) and limit the number of questions on other topics.
- Cross-survey imputations relying on structural models (like SWIFT) tend to under-estimate the poverty impact of a shock.



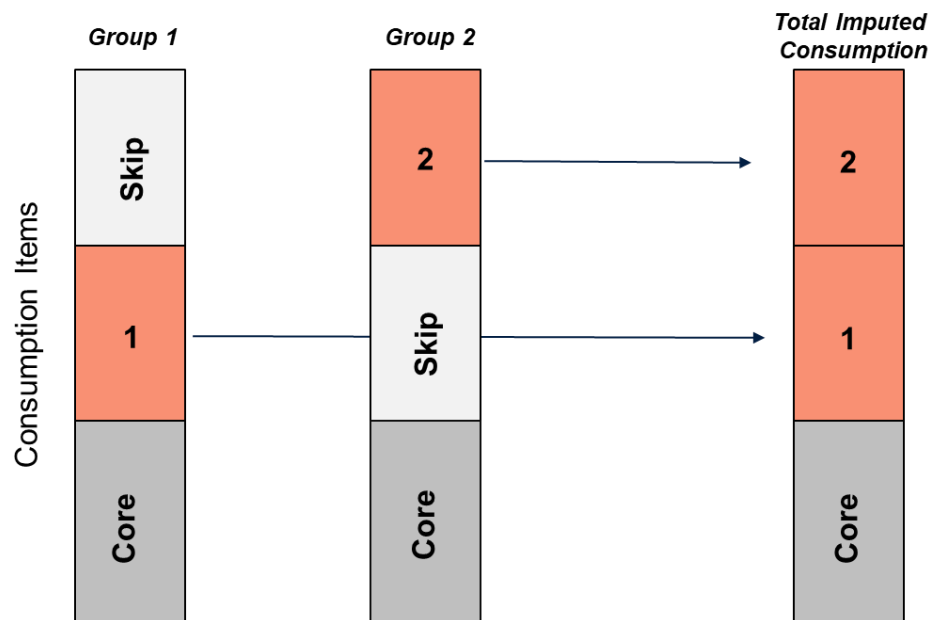




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- The Rapid Consumption Methodology reduces the number of items per household by assigning different modules of items to different households.

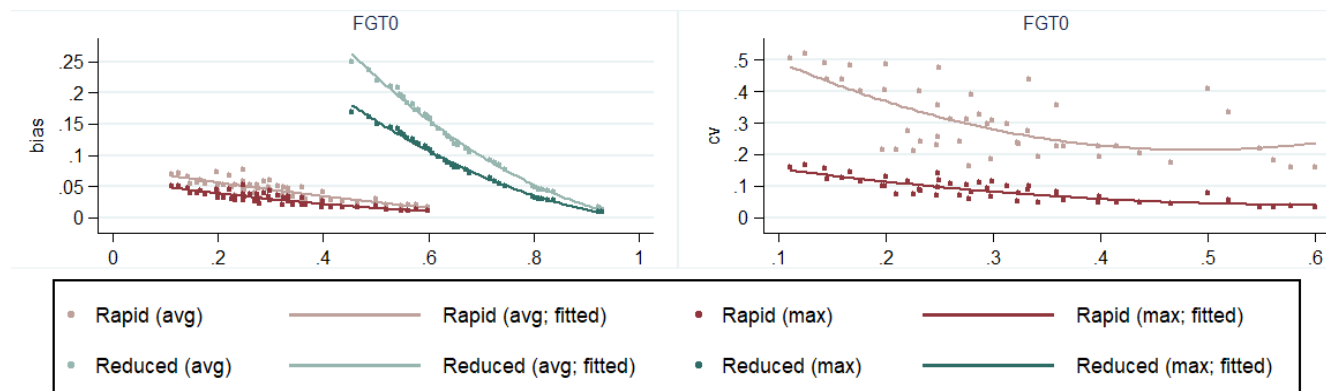




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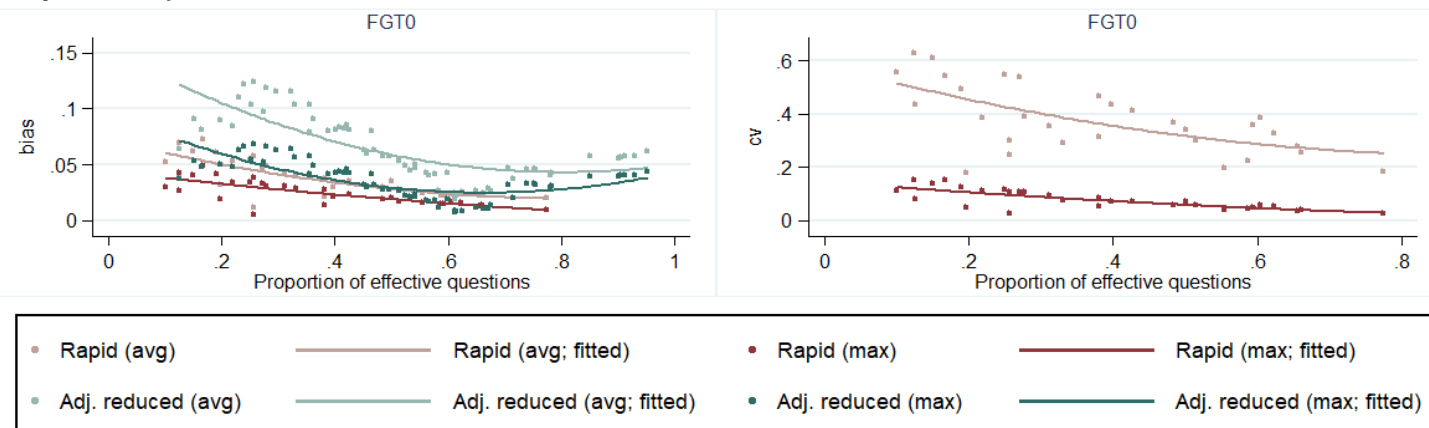
Comparing Kenya 2015 imputation (Rapid + Reduced) with Kenya 2015 Survey results.



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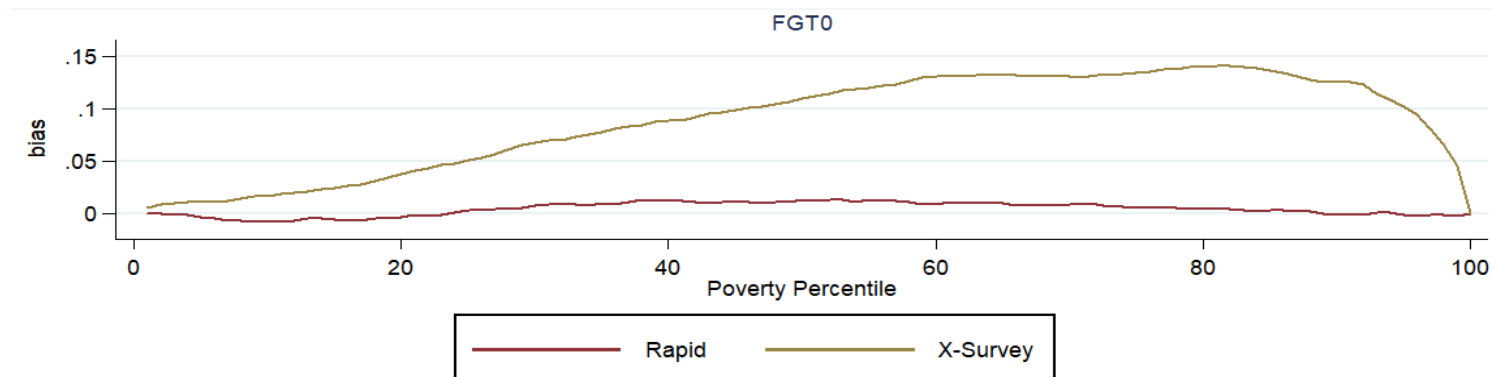
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Comparing Kenya 2015 imputation (Rapid + Cross-Survey based on Kenya 2005) with Kenya 2015 Survey results.

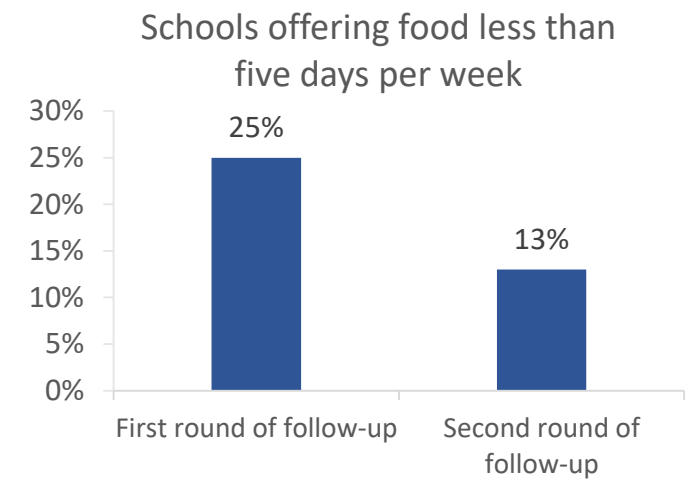
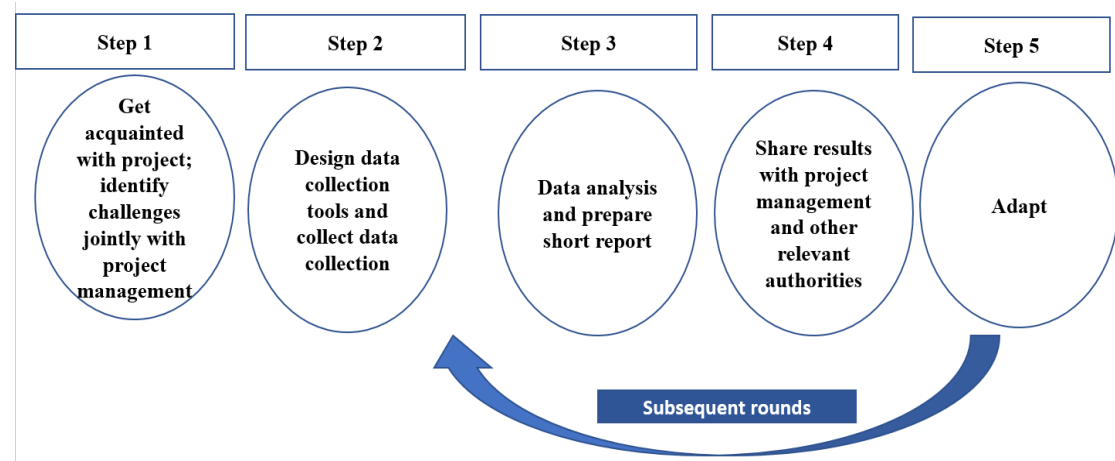
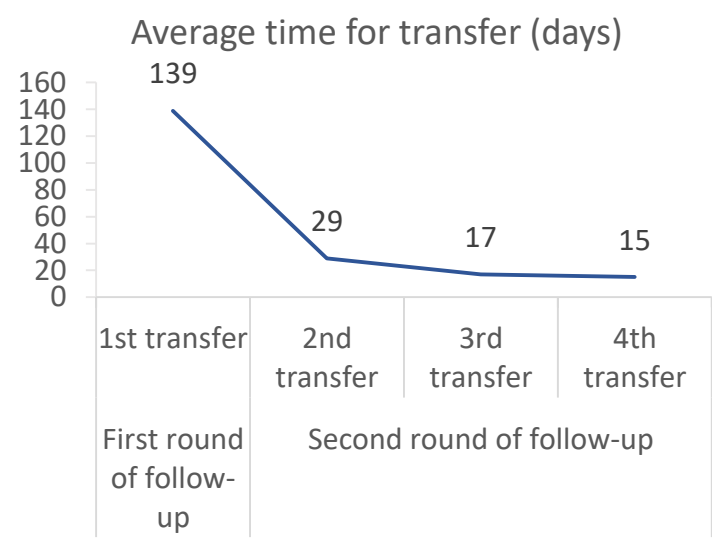




# Iterative Beneficiary Monitoring utilizes quick rounds of CAPI surveys to iteratively adapt project designs.

Designed as a light, low-cost, independent, and iterative feedback loop that collects information directly from beneficiaries and produces short reports on challenges that can be addressed by the project team, this approach improves project efficiency and increases beneficiary engagement and satisfaction.

In Mali, the number of days to transfer funds to schools for school children feeding considerably improved with project implementation.





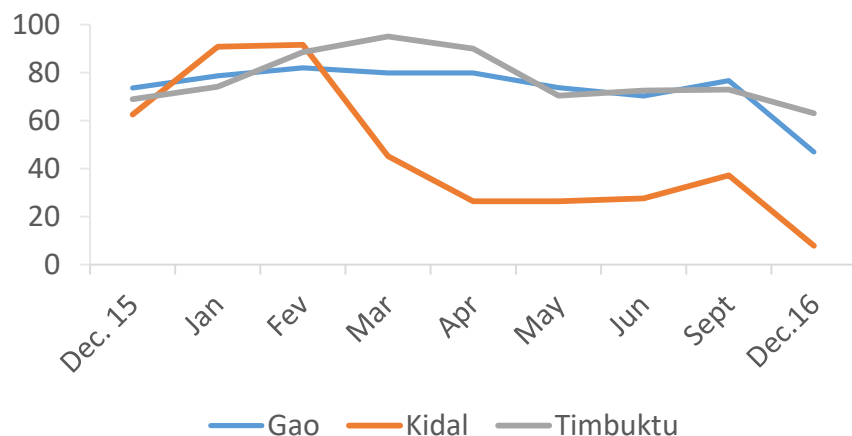
# Tablets allow to embed enumerators in communities. An example: Peace accord monitoring in Mali.

**35 enumerators equipped with tablets, phones and bicycles, live in northern Mali and collect data quarterly.**

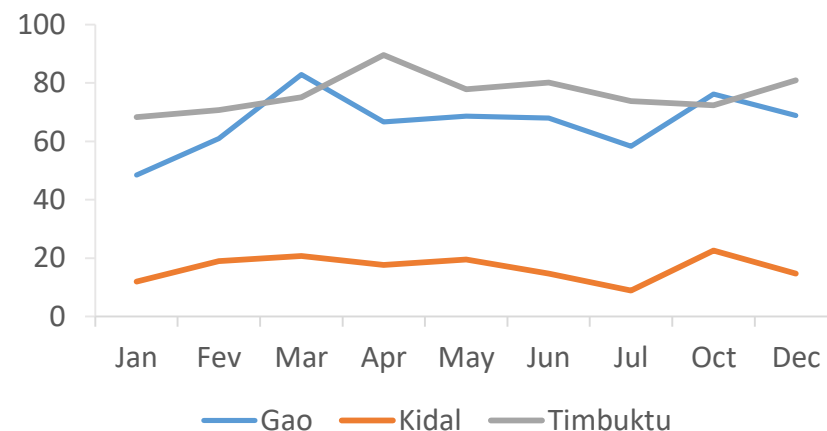
- Monthly snapshots of data on welfare, security and perception.
- Allows close monitoring of vulnerabilities and use as early warning system.



Feeling secure while at home at night



With confidence in the Government

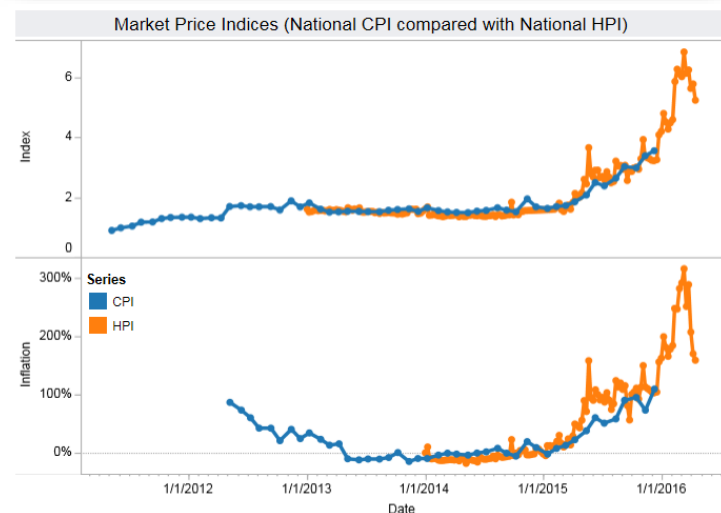




# Tablets reduce time from data collection to dissemination. An example: Tracking of real-time market prices.

In South Sudan, the dashboard informs policy makers of the volatile macro-economic situation.

- Daily exchange rate and weekly market price collection in South Sudan and Somalia.
- Real-time submission from tablet to cloud; automated cleaning through Stata and presentation in Tableau.
- Allows real-time tracking of macro-economic indicators (exchange rate and inflation).
- Customizable questionnaires, e.g. added depth of parallel market and commercial rates overnight.
- Public dashboards are used regularly (>100 views per month).





# Increased mobile phone coverage enables rapid surveys.

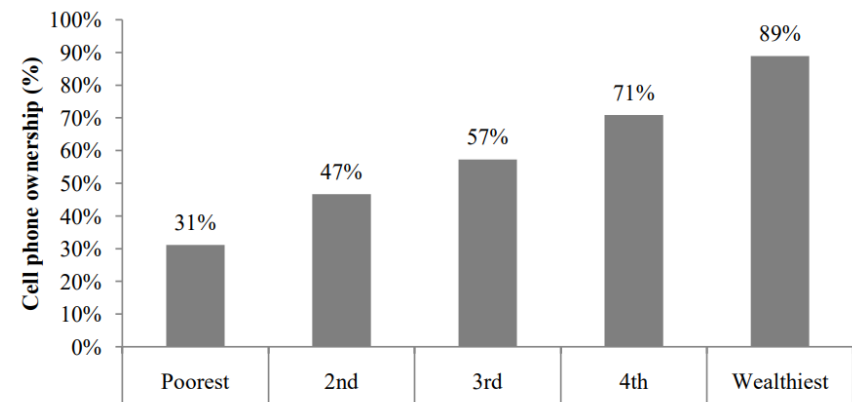
## An example: Listening To Africa (L2A).

L2A is a collaboration with national statistical offices and NGOs in sub-Saharan Africa to pilot the use of mobile phones to regularly collect information on living conditions.

- At baseline, a face-to-face interview is conducted and a mobile phone (plus solar charger) handed out.
- Once a month, a 20-minute interview is conducted and remunerated with air-time.
- Coverage:
  - Malawi
  - Madagascar
  - Tanzania
  - Togo
  - Senegal



Cell Phone Ownership in Tanzania (2010/11)





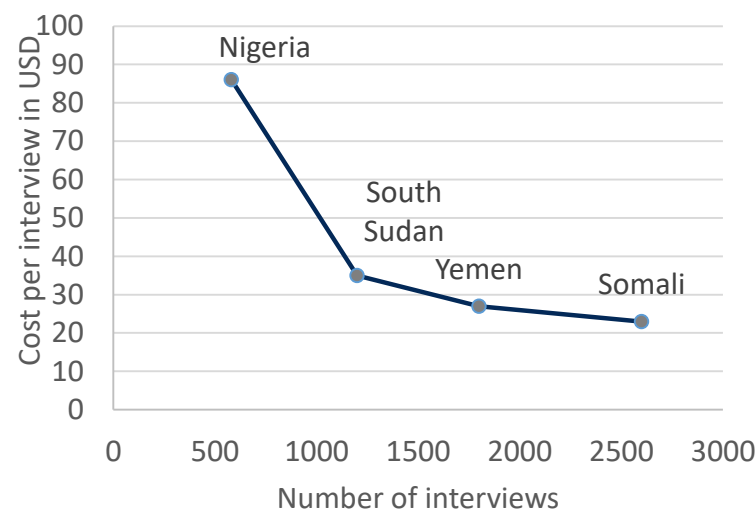


# Increased mobile phone coverage enables rapid surveys.

## Another example: Emergency Response Phone Survey.

The Emergency Response Survey was designed, conducted and analyzed in 4 months, including phone interviews with 6,500+ respondents.

- 20-minute mobile phone survey through call centers.
- Representative sample of the population that uses mobile phones by:
  - a) random digit dialing (RDD; South Sudan & Yemen);
  - b) bulk text message for consent (Somalia); and
  - c) predetermined sample household of a representative survey (Nigeria).



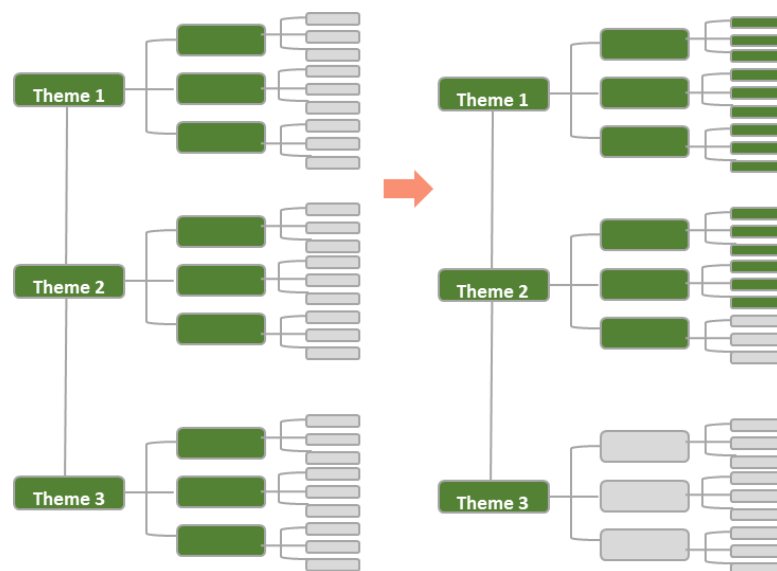


# Mobile Phone Surveys require short questionnaires. Adaptive questionnaire design can mitigate this constraint.

Adaptive questionnaire design can allow in-depth exploration of relevant themes.

- Testing many hypotheses on diverse themes (education, livelihoods, health, market access, food security, water access) limits in-depth exploration of themes.
- An adaptive questionnaire can be updated during data collection after every 500 observations, dropping themes which are less important and increasing the detail on themes that are important.
- The nature of the random sample automatically ensures that ‘missing responses’ are randomly distributed. Thus, the collected responses can be adjusted to be representative.

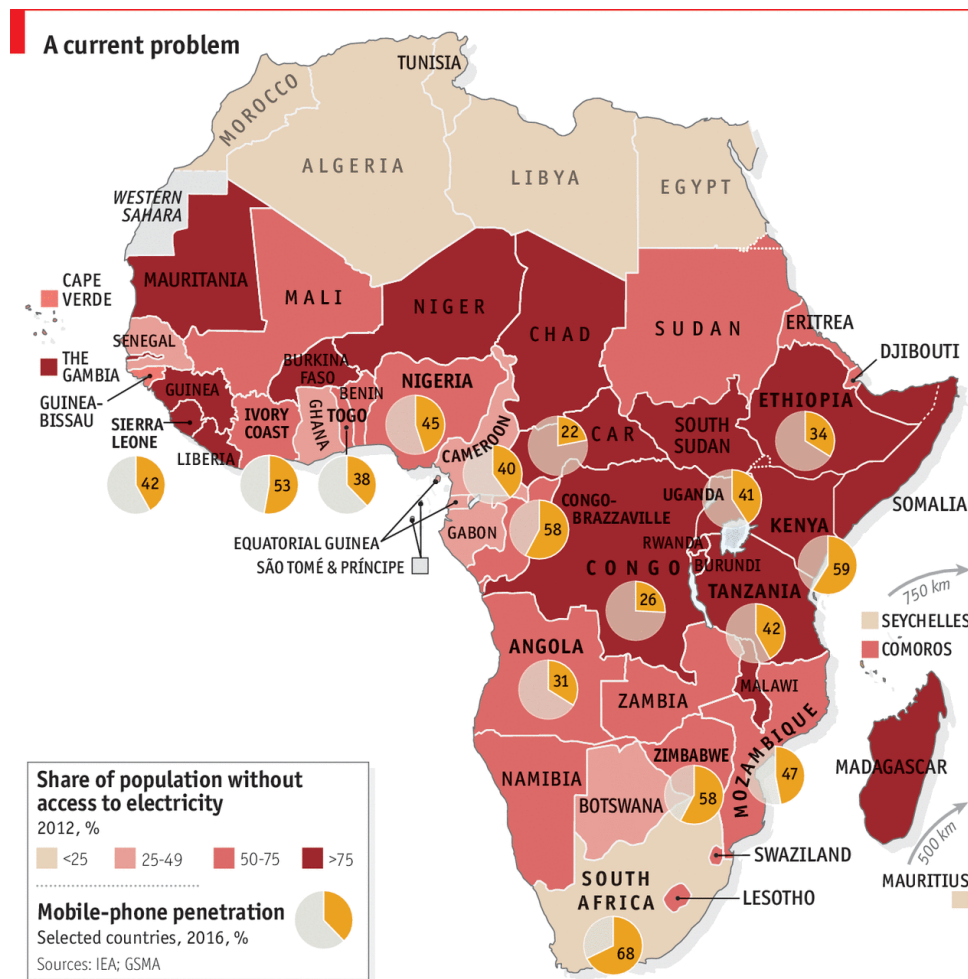
## Adapting Questionnaire after a given number of interviews





# Mobile Phone Surveys are not nationally representative. Still low penetration rate and biased against the poor.

- Mobile phone penetration rarely exceeds half of the population.
- Cell phone ownership is biased against the poor.
- Even though poor people might own a cell phone, charging and airtime constrain its usage.



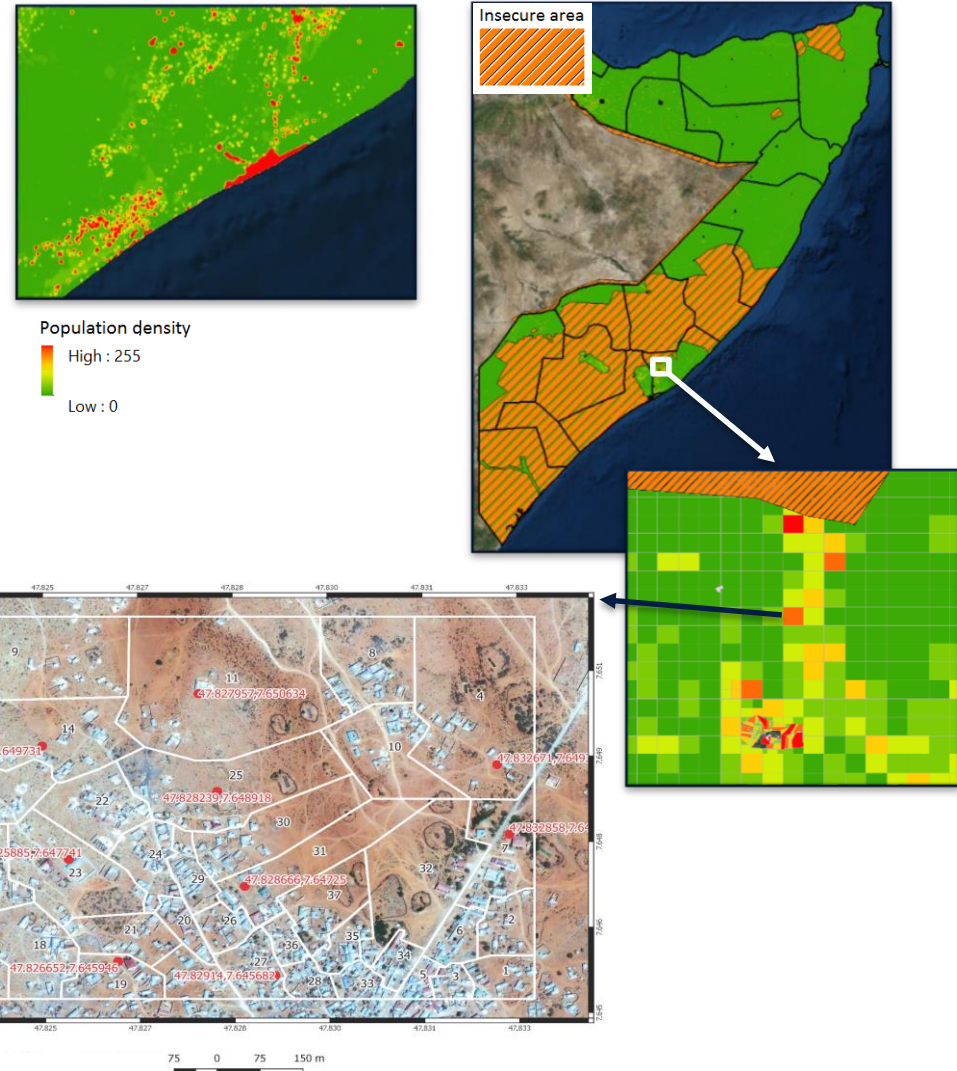
Economist.com



# Satellite images mitigate lack of field access.

## For example: Updating of a sampling frame in Somalia.

- An up-to-date sampling frame is of fundamental importance to conduct representative surveys.
- Shocks and especially displacement can outdate sampling frames quickly.
- With high costs and low frequency of Censuses, satellite images offer an alternative to update sampling frames.
- However, satellite images can be prohibitively expensive.
- Design of algorithms require deep machine learning knowledge.
- Outputs often still need manual verification and editing.





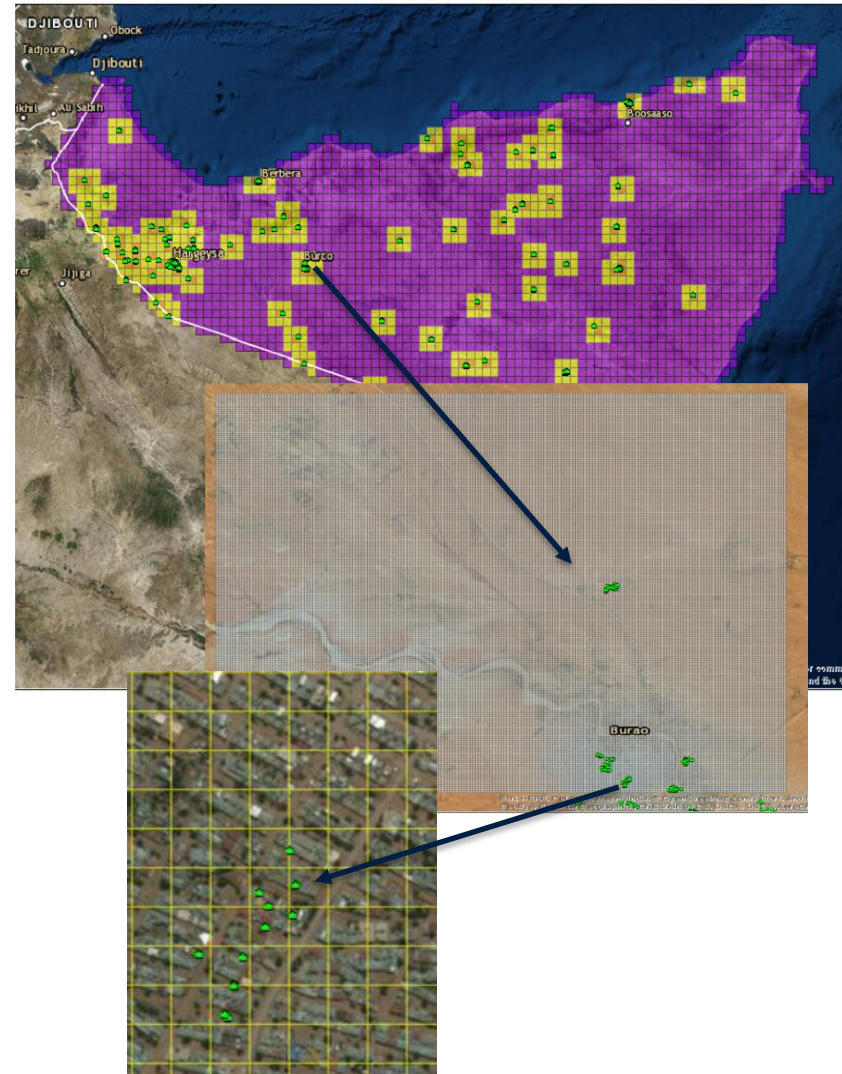


# Satellite images mitigate lack of field access.

## Another example: Poverty imputations for insecure areas.

Field surveys in fragile countries often lack access to insecure areas, under-representing a particularly vulnerable part of the population. Poverty imputations can mitigate the under-representation to some extent.

- The imputation estimates a structural model on geographic features extracted from satellite images to estimate poverty for known locations of household respondents.
- The structural model can then be applied to areas without household respondents to estimate poverty.
- The structural model can under-estimate the impact of conflict on poverty.
- Satellite images can be expensive; calculations are computationally intense.



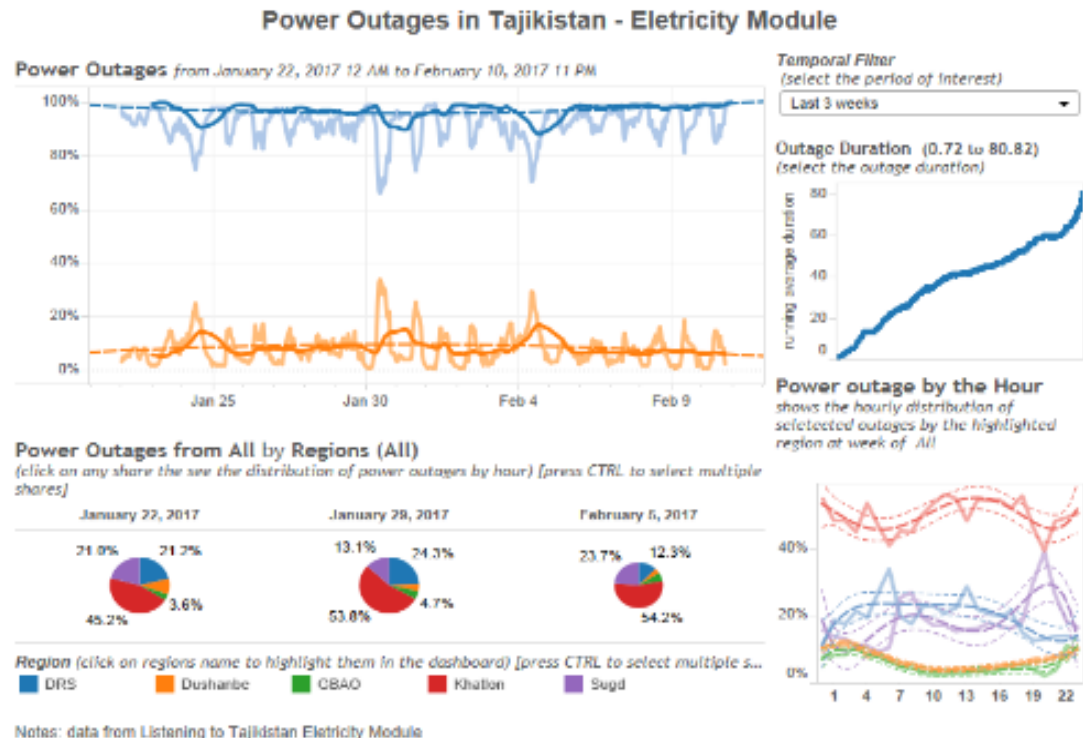


# Smart Survey Boxes can track real-time indicators.

## An example: Monitoring power outages.

Pilot project to monitor power outages automatically with a autonomous devices that send a signal if a power outage is detected.

- 300 boxes deployed.
- Less than 1 US\$ per day per box.
- Remote sensing enabling.





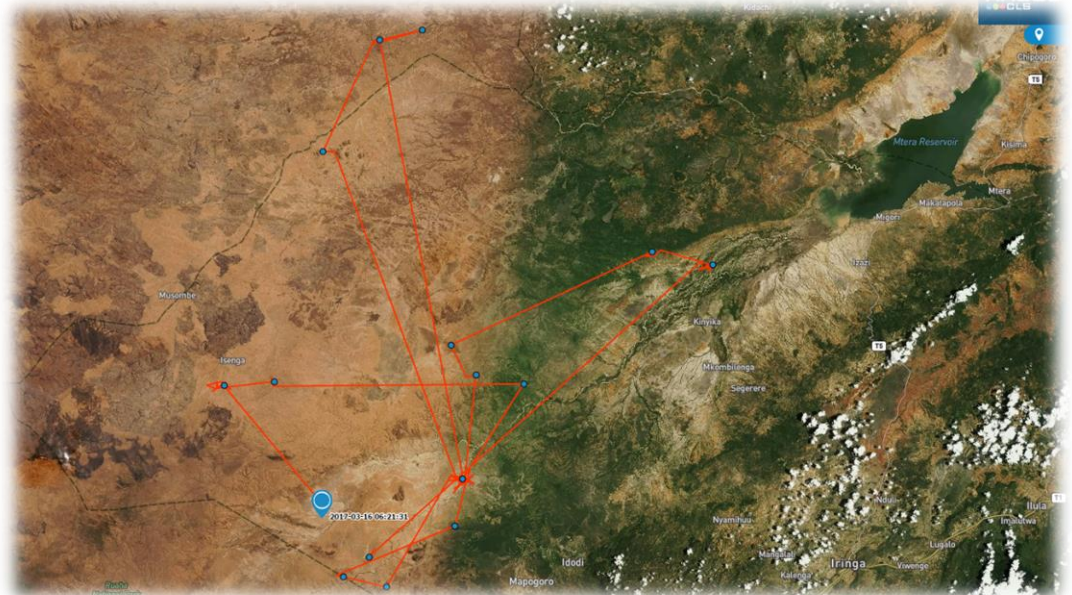


# Smart Survey Boxes can track real-time indicators.

## Another example: Tracking Somali nomads.

Pilot project to track improve our understanding nomadic migration patterns for better service delivery and improved sampling frames.

- Devices are built in a robust way.
- Devices send a location signal every few days.
- Devices are sewn into tent covers.
- Battery lasts for at least 2 years.



# Technology changes the way we are collecting data, measuring poverty and assessing the impact of interventions.



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