

TALIP KILIC

Living Standards Measurement Study
Poverty & Inequality Group
Development Research Group

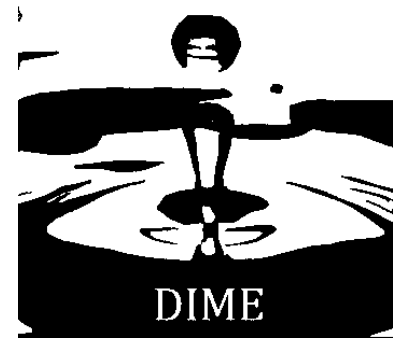
ZURAB SAJAIA

Computational Tools Group
Development Research Group

Computer-Assisted Personal Interviewing



Development Impact Evaluation
Field Coordinator Training
Washington, DC
April 22-25, 2013





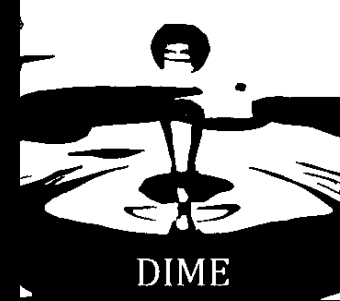
Computer-Assisted Personal Interviewing (CAPI)



- **PAPI:** Paper-based personal interviewing, coupled with computer-assisted field-based data entry (**CAFE**) pioneered by the LSMS
- **CAPI:** Integration of interviewing & data entry through the use of a handheld device, preloaded with an electronic questionnaire
- Household (HH) surveys implemented on CAPI platform since the late '80's in high- & middle-income countries, inc. the Netherlands, the UK, the US, Norway & Turkey
- Increasing number of applications in low-income setting in recent years
 - Mobile Phones, PDAs vs. **Netbooks & Tablet PCs**
- Need to balance urgency & quality, to emphasize value of experimentation & research



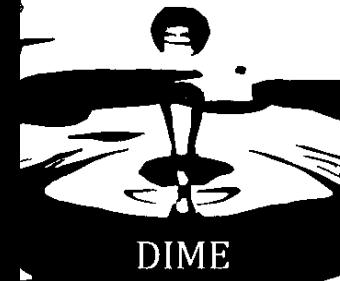
LSMS Experience



- LSMS operations marked by a gradual transition to CAPI
 - 2003 – CAPI survey experiment (Albania, CSProX, 200 HHs)
 - 2007 – CAPI survey (Ngara District, Tanzania, CWEST, ~500 HHs)
 - 2010 – KHDS (Kagera District, Tanzania, CWEST)
 - 2009-2014 – Uganda National Panel Survey
 - Supported by LSMS-ISA, implemented by UBoS
 - Partial transition to CAPI in 2010/11 (*CWEST*); CAPI transition completed in 2011/12 (*CWEST & Surveybe*); Next round 2013/14
 - 2011-2014 – Ethiopia Rural Socioeconomic Survey
 - Supported by LSMS-ISA, implemented by CSA
 - Partial transition to CAPI in 2011/12 for the Agriculture Questionnaire, in a subset of EAs (*Surveybe*); Next round in 2013/14



Hardware Options



Samsung Q1b Ultra
(KHDS; UNPS)
\$650-700



Asus Eee PC T101MT
(UNPS; ERSS)
\$450-500



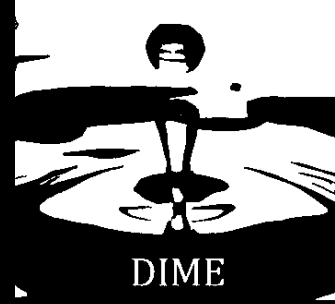
Google Nexus 10 Tablet
\$400-600

General Features:

- 7-10" stylus-/touch-friendly screens
 - Rapid navigation across questionnaire
 - Several questions displayed at one time
- Camera, microphone, virtual keyboard & hand-writing recognition software
- 5-7 hours of (initial) battery life
 - Extended battery pack, external battery pack & daily charge of batteries recommended
 - Generators in low-electrification settings
- Multiple ports: Internet dongles, GPS units, external keyboards



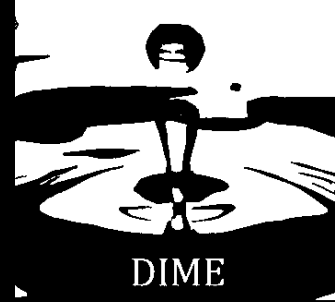
Software Options



- Traditional DE software designed for transfer from paper questionnaire to computer
 - CAPI benefits better realized working with software packages designed for interactive interviewing
- CAPI software packages make up a small market, with varying degrees of cost effectiveness & strengths
 - Key players: *Blaise, CASES, CProX, MMIC & Surveybe*
- LSMS-commissioned comparative assessment of software programs for the development of CAPI applications (www.worldbank.org/lms-isa)
- CAPI Platform development underway in DECCT, in collaboration with the LSMS



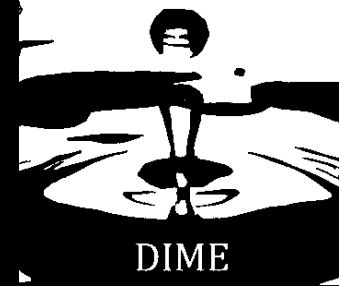
Why CAPI?



- Expected gains in timeliness of data availability
 - Data entry, checking & exportation in one application
- Enhanced tools for in-field/remote management of teams under one roof
 - Headquarters & Team Leaders: Assigning work, tracking progress, immediate & comprehensive feedback
- Expected gains in scope & quality of data
 - Real time survey experiments/questionnaire randomization
 - GPS coordinates, time stamps, audio & video recording
 - Accommodation of [non-linear/integrated questionnaires](#)
 - [Automated routing](#) reduces the incidence of missing data
 - [Data checking](#), reporting & revision facilities during the interview
 - [Improvements](#) in quantification of non-standard units
 - Instructions on questions, note taking facilities >>



Non-linear Navigation



T Household number **1021000402** CHRISTINE_MALIA_ALUMA **Roster**

1. Start 2. Roster 3. Member Details 4. Housing & Energy 5. Income & Assets 6. Consumption 7. Misc. 8. Agri 9. Finish

We would like to make a complete list of Household members in the last 12 months including guests who slept here last night' and those that left permanently

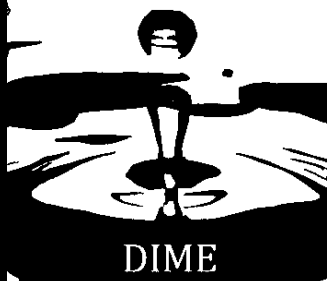
Add new HH member **Update HH Location** **Visit Number:** **Check**

Wave1	Name	Gender	Residential Status	Age	Moved	Died	Demographics
<input checked="" type="checkbox"/>	1 Mugalu Mohammed	Male [1]	Usual member present [1]	3	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	2 Gadaffi Ismail	Male [1]	Usual member present [1]	25	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	3 Kimbowa Martin	Male [1]	Usual member present [1]	19	<input type="checkbox"/>	<input type="checkbox"/>	

Tracking information



Automated Routing



T3ba Education Details Household ID 1021000402 Check

Education 1 Education 2 Education 3

1

IS Gadaffi ANSWERING FOR HIMSELF OR HERSELF?

Yes [1]

2.

WHAT IS THE NAME OF THE PERSON RESPONDING FOR Gadaffi?

3.

Can Gadaffi read and write with understanding in any language?

nable to read and write [1]

4.

Has Gadaffi ever attended any formal school?

Never attended [1]

5.

Why has Gadaffi not attended school?

6.

What was the highest grade/dass that Gadaffi completed?

7.

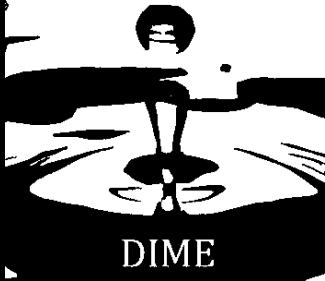
What was the main reason that Gadaffi left school?

8.

What grade/dass was Gadaffi attending in the last complet



Consistency Checks



T3ca

Health Details

Household ID 1021000402

Check

Health 1

Health 2

1

IS Mugalu ANSWERING FOR HIMSELF OR HERSELF?

No [2]

2.

WHAT IS THE NAME OF THE PERSON RESPONDING FOR Mugalu?

Kimbowa Martin

3.

During the past 30 days, did Mugalu suffer from any illness or injury?

Yes [1]

4.

For how many days did Mugalu suffer due to illness or injury during the past 30 days?

4

5.

For how many days did Mugalu have to stop doing Mugalu's usual activities due to illness o...

12

6.

Can you describe the symptoms that Mugalu primarily suffered due to

Diarrhoea (acute) [1]

7.

Can you describe the symptoms that Mugalu primarily suffered due to

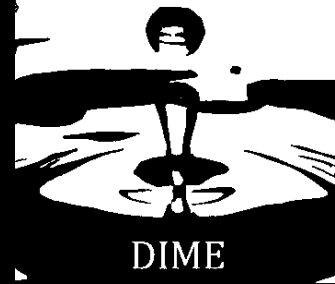
8.

Was anyone consulted (e.g. a doctor, nurse, pharmacist or traditional healer) for the majo...

Yes [1]



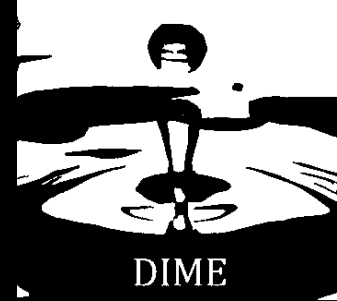
Consistency Checks (Cont'd)



T3c	Member Health	Household ID:	1021000402	Check	
1. Wave 1	2. Name	3. Age	4. Health Info		
	1	Mugalu Mohammed	3		a. Health
	2	Gadaffi Ismail	25		a. Health
	3	Kimbowa Martin	19		a. Health



Consistency Checks (Cont'd)



T Household number **1021000402** CHRISTINE_MALIA_ALUMA **Roster**

1. Start 2. Roster 3. Member Details 4. Housing & Energy 5. Income & Assets 6. Consumption 7. Misc. 8. Agri 9. Finish

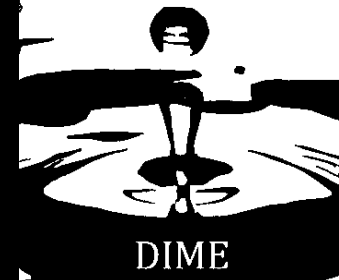
COMPLETE validation check

Update Visit Result ► V

General comments **Question specific comments**



Use of Media for Better Quantification



T6AE Food consumption item

105 Sweet potatoes (fresh)

Household ID 1021000402

Over the last 7 days



If none,
enter 0

1_1 How many days in the past 7 days was Sweet potatoes (fresh) consumed? 7

2.

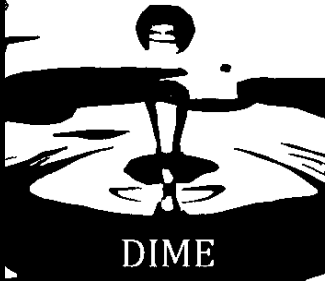
Unit of quantity



	Quantity	Value
3. Amount of Sweet potatoes (fresh) consumed in the HOUSEHOLD over the last 7 days which came from PURCHASE...	<input type="text"/>	<input type="text"/>
4. Amount of Sweet potatoes (fresh) consumed AWAY FROM HOME over the last 7 days which came from PURCHASES...	<input type="text"/>	<input type="text"/>
5. Amount of Sweet potatoes (fresh) consumed over the last 7 days which came from HOME PRODUCTION?	<input type="text"/>	<input type="text"/>
6. Amount of Sweet potatoes (fresh) consumed over the last 7 days which came from GIFTS/IN-KIND sources?	<input type="text"/>	<input type="text"/>
Totals	0.0	0.0



Use of Media for Better Quantification



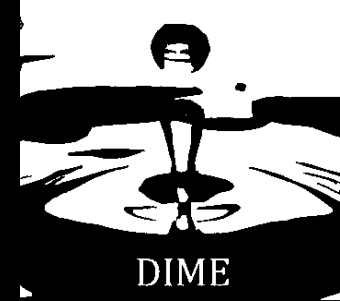
◀ ▶ **Nomi Tin(500g)**
(FU-000120.jpg : 5 of 8)

use unit + - 🔊





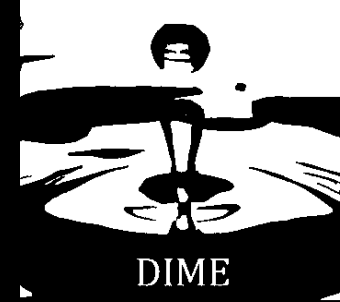
Managing Expectations



- Data quality control principles in CAPI set-up no different than surveys based on PAPI with CAFE
- CAPI tools useful as much as enumerators & field supervisors take advantage of available facilities & act on inconsistencies
- Relative impact of CAPI on data quality: Open question, more experimentation & research necessary
 - Limited evidence on improved data quality with respect to a well-supervised survey based on PAPI with CAFE
 - Fafchamps, M., McKenzie, D., Quinn, S., and Woodruff, C. (2010). Using PDA consistency checks to increase the precision of profits and sales measurement in panels. CSAE Working Paper Series No. 2010-19.
 - Caeyers, B., Chalmers, N., and De Weerd, J. (2012). “Improving consumption measurement and other survey data through from a randomized experiment.” *JDE*, 98, pp. 19–33.



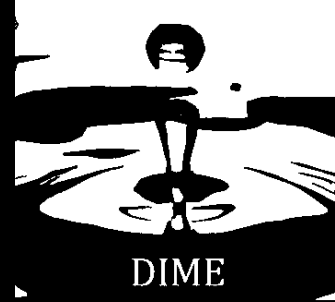
Cost Implications



- CAPI generates (minimal) savings in printing costs & data entry
 - Savings increase with the complexity & frequency of survey
- Significant up-front costs in programming & hardware procurement
 - More cost-effective if machines are used in other survey operations
 - Need to budget for the possibility of hardware failure
- Increased need for more pilots ahead of the field work
- Transition into CAPI also driven by field work structure
 - Size of the enumerator corps may be prohibitively large
- Gradual transition to CAPI as part of the LSMS operations primarily underlined by demand for increased data quality & availability



Uganda National Panel Survey (UNPS) - CAPI Experience



- Teams quick to adapt, instrumental in training & knowledge sharing
- Required change in institutional thinking on HH survey: Greater up-front work (& costs) with respect to PAPI with CAFE
 - Prep of Wave I (PAPI) data uploaded onto Wave II (CAPI) application
 - Intra/inter-module consistency checks, in addition to range & default checks for missing values
 - Programming of rules on generation of household & individual identifiers for new additions to the sample
 - Training of UBoS Headquarters staff on case management suite



UNPS CAPI Experience (Cont'd)



- In-country procurement problems
 - Lags assoc. with operating within Government systems/unreliable suppliers
 - US procurement by the LSMS-ISA project: Not straightforward either
- Anti-virus software critical to maintaining the hardware integrity
- Application glitches even after piloting three times: Need for more intensive testing in comparison to PAPI with CAFE
- CAPI application platform based on multiple software packages: *CWEST* & *CSPPro* (in 2010/11); *CWEST* & *Surveybe* (in 2011/12)
 - Dependence on the *CWEST* application developer for adjustments
 - Continued reliance on multiple software packages necessitated by lack of case management features on *Surveybe*
- Timely communication of bugs that might compromise the integrity of incoming data critical: No paper questionnaires to re-enter



UNPS CAPI Experience (Cont'd)



- Continuing improvements to the CAPI application on a rolling basis throughout the field work
- Even with internet dongles, slow internet speeds & lack of service in certain areas
 - Affects timely headquarters review of data sent from the field
 - Receipt of application updates by the survey teams not always timely
- Regular backup of interview files in the field & at the HQ crucial
- Still need a paper questionnaire for dissemination purposes: CAPI application dictionary is not more than a linear questionnaire report



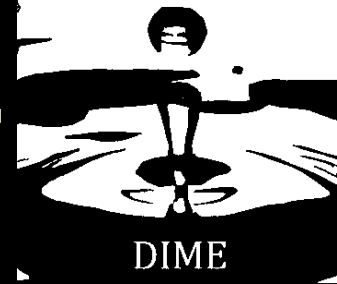
Comparative Assessment of Software Programs for the Development of CAPI Applications



- Initially twofold objective:
 - Inform internal decision making on the choice of surveys for upcoming surveys planned under the LSMS-ISA project, in Uganda, Ethiopia, and Nigeria
 - Fill the gap in public knowledge on the relative performance of available software packages for the development of CAPI applications for multi-topic household surveys
- Peer-reviewed report, managed by the LSMS team, compiled by the IRIS Center at the University of Maryland, reviewed by software developers prior to release
- Available on www.worldbank.org/lsms-isa



Comparative Assessment... (Cont'd)

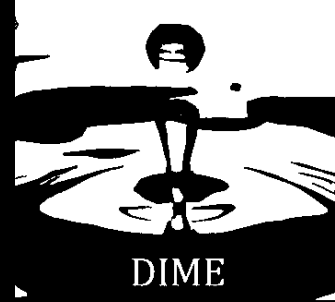


Software packages screened as suitable for the development of CAPI applications for multi-topic household surveys & evaluated by the report include:

Software	Developer
Blaise	Westat & Statistics Netherlands
CASES	Computer-Assisted Survey Methods Program at the UC Berkeley
CSProX	Serpro, S. A.
Entyware	Techneos
MMIC	RAND Labor and Population
Open Data Kit	Dept. of Computer Science & Engineering at the Univ. of Washington
Pendragon Forms	Pendragon Software Corporation
Surveybe	Economic Development Initiatives



Comparative Assessment... (Cont'd)



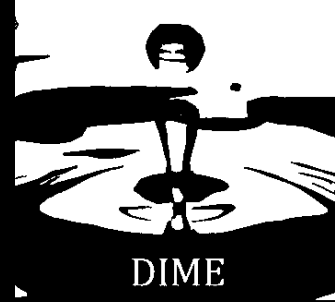
- Structure of the report
 - Brief overview of each software package
 - Comparative assessment of each software package in 12 areas:

Evaluation Areas	
Programming	Data Transfer
Questionnaire Development	Data Exporting
Questionnaire Implementation	Support & Documentation
Interface for Field Users	Hardware & Software Needs
Questionnaire Navigation	Pricing & Upgrades
Case Management	Extensibility

- Detailed evaluation of each software package, accompanied with full functionality check lists



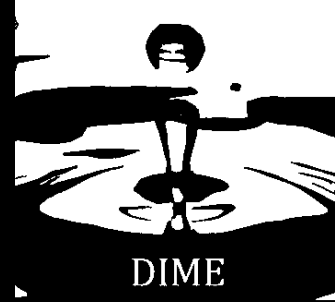
Comparative Assessment... (Cont'd)



- No software package is an unequivocal frontrunner in all evaluation areas
- Missing across the landscape: A menu-driven development environment for novice users & a command line for more experienced users
- Positive relationship between quality/scope of documentation & proprietary nature of the software (*MMIC*, *ODK* vs. *Blaise*)
- Top contenders:
 - *Surveybe*: Ease to use (menu-based development environment) but lacks case management suite & only allowed for sequential workflow for questionnaire development at the time (under development)
 - *MMIC* & *Blaise*: Powerful & expansive in scope but steep learning curve (command line driven development environment) & high need for technical assistance



Where next?



- Sustainability of adoption relies on availability of a user-friendly, yet highly customizable, public solution
- LSMS & Development Economics Computational Tools (DECCT) Unit supporting the development of a free CAPI software platform
- Initially informed by LSMS field experience & comparative CAPI software assessment, recent pilot activities as well
- Core interface components: **Designer** (for Survey Designers), **Survey Manager** (for Survey Management at the Headquarters & Team Leaders in the Field) & **Client** (for Interviewers)