

# From Coast to Cloud

A synopsis of the Sustainable Fisheries Management Project  
Baseline Survey

# Overview of Presentation

- Survey Background
  - SFMP objective and baseline questions of interest
  - Sample size, communities, and GIS sampling
- Paperless Survey Specifics
  - Software used
  - Lifecycle of a paperless survey
- Training, Logistics, and Supervision
  - Additional training and considerations
  - Real-time field supervision aids

# Survey Design Team

- Core Design Team
  - Dr. Brian Crawford, SFMP Chief of Party
  - Hardi Bakari, SFMP Monitoring and Evaluation Officer
  - Dr. Liliana Gonzalez, URI Statistics Section Head
  - Daven Amin, URI Statistics Graduate Assistant
- Supporting Team Members
  - Justice Mensah, Hen Mpoano GIS Expert
  - Yaw Amo Sarpong, Baseline Survey Field Supervisor, KNUST
  - Najih Lazar, SFMP Senior Fisheries Advisor
  - Kofi Agbogah, Hen Mpoano Director

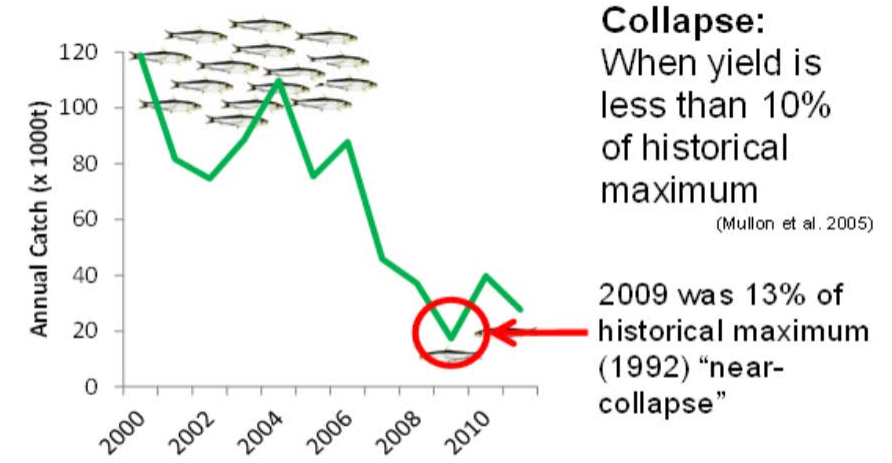
# Sustainable Fisheries Management Project (SFMP) Objective

“The SFMP squarely aims to rebuild targeted fish stocks. Adoption of sustainable fishing practices and reduced exploitation to end overfishing is the only way Ghana can increase its wild-caught local marine food fish supply and bring greater profitability to the fishery, with the potential to benefit over 130,000 people directly and up to two million indirectly.”

- SFMP Program Description, 2014

“Fish comprises a third of animal-based food protein consumed in Africa, and in Ghana that number reaches approximately 60%...”

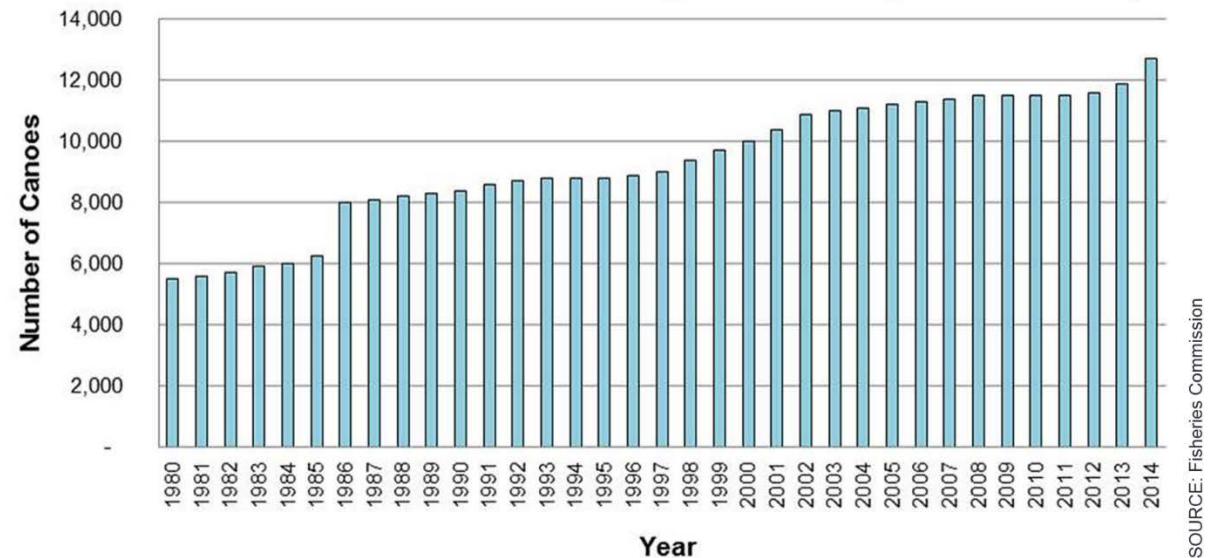
- SFMP Issue Brief: Ghana’s Small Pelagic Fishery in Crisis, 2015



**Ghanaian canoe catch of sardinella spp.**

(Source credit: Proceedings of the 3rd National Fisheries Dialogue: WorldFish)

**NUMBER OF FISHING CANOES (1980-2014)**

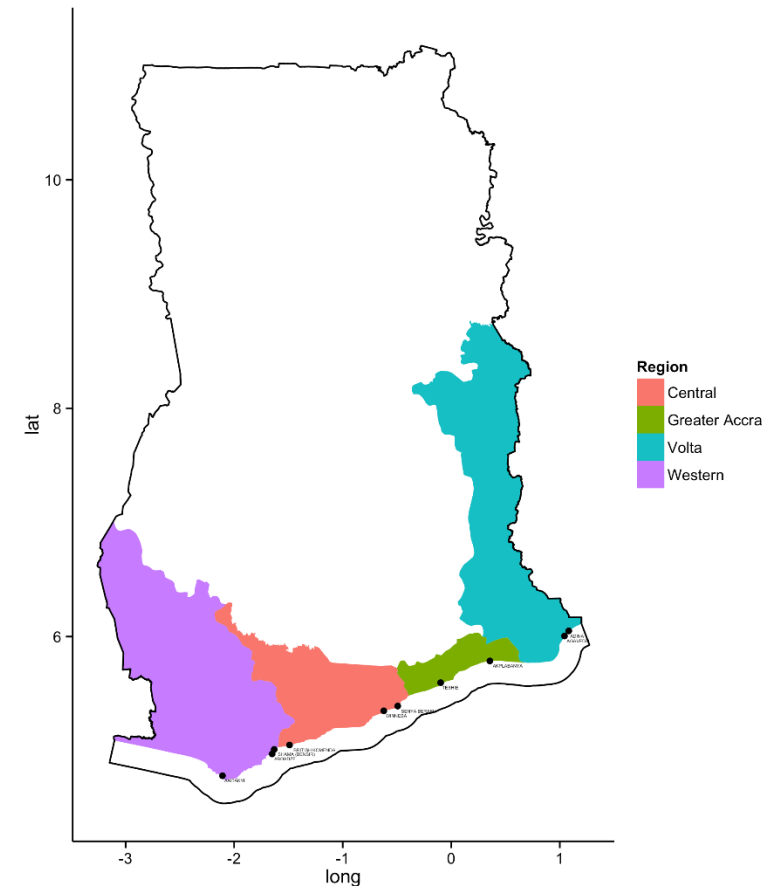


# Questions of Interest

- Baseline information on small pelagic fisheries members
  - Perceptions of fish abundance
  - Women empowerment
    - Participation in decision making
  - Prevalence of illegal fishing practices
    - Degree of Compliance
    - Child labor and trafficking
  - Dietary diversity and household demographics
- Measure impact of interventions by re-administering survey at project mid-point and conclusion

# Sampling Methodology

- Number of villages: 10
  - restricted by finite project resources
- Number of household samples: 450
  - determined by power analysis and potential attrition
  - required to detect medium or large effect sizes in perception questions
- Samples proportionally distributed
  - among villages by number of fishermen recorded in 2013 Canoe Frame Survey



Source: OpenStreetMap, GeoNames

# Sampling Methodology



Difficulties of selecting representative samples:

Source: Daven Amin

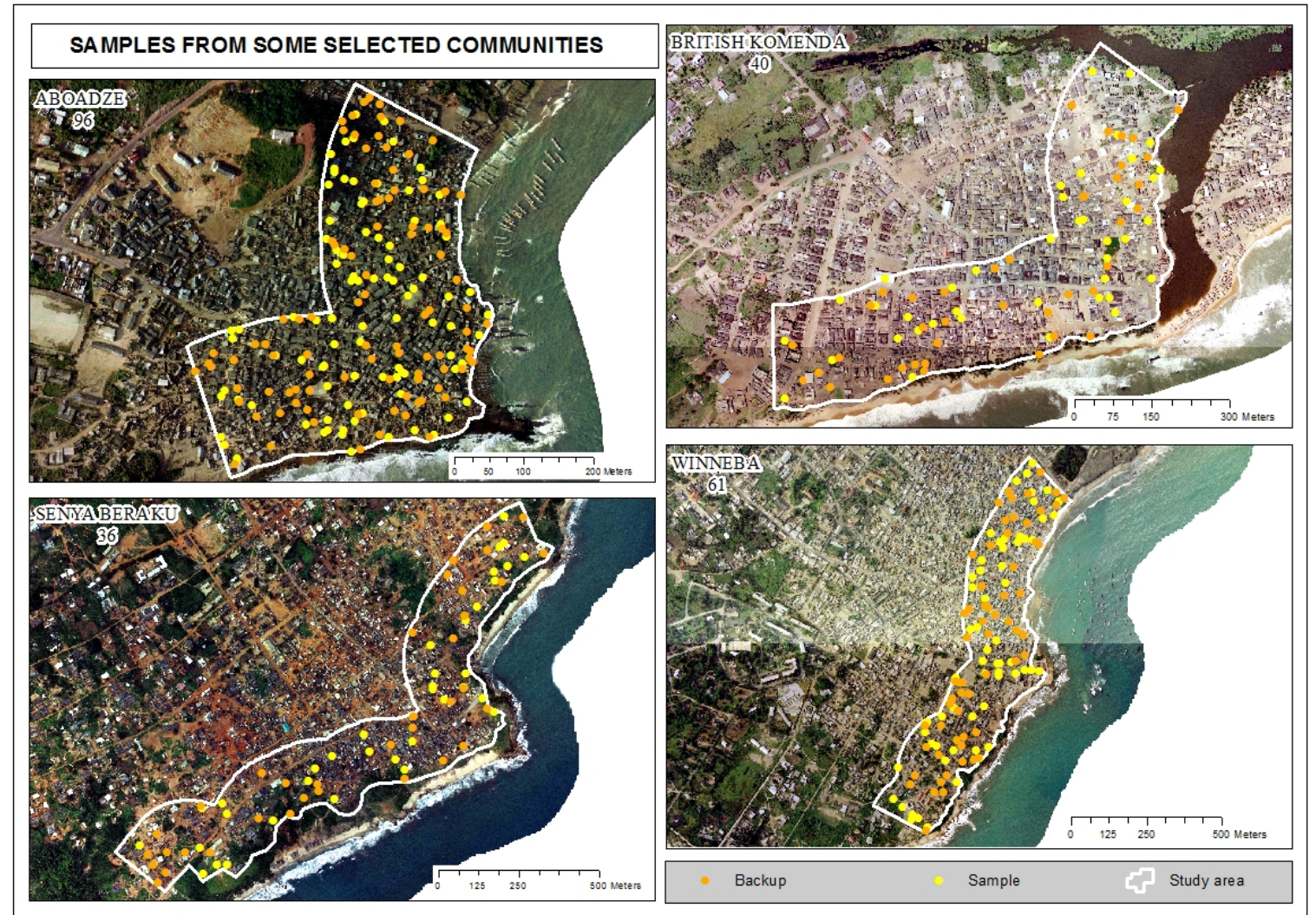
No guarantee of village resident lists, house numbers, or street names!



# Sampling Methodology

Sampling locations created using ArcGIS:

- Drawn from buffer region 200m inland from coastline
  - Assumption: representative majority of target population lives in close proximity to landing sites
- Sample locations and equivalent number of “backup” samples loaded into Google Maps on tablets
  - Google Maps requires data connectivity, so offline Android map application was developed for adverse situations





# Paperless Survey Considerations

- Standards Compliance
  - Questionnaire authored in XLSForm, readable by various software solutions
- Offline Data Collection
  - Enketo Smart Paper stores completed forms until wireless data is available
- Open Source Software
  - KoBoToolbox can be hosted by CRC or any individual/organization with required infrastructure

XLSForm.org



Sources: [xlsform.org](https://xlsform.org), [enketo.org](https://enketo.org), [kobotoolbox.org](https://kobotoolbox.org)

# Authoring an XLSForm

	A	B	C	D	E	F	G
1	name	type	required	label	relevant	constraint	constraint_message
36	ftf_c	begin group		Household Demographics	\${consent}='1'		
37	note_c	note		<b>**NOTE TO ENUMERATOR:**</b> All applicable questionnaire sections should be asked of the head of household and seniormost gender-opposite household member as separate survey entries.			
38	member_type	select_one respondent	yes	B 1.01 Is the respondent the head of household, or the gender-opposite seniormost household member?			
39	member_gender	select_one gender	yes	B 1.02 What is the respondent's gender?			
40	member_age_input	integer	yes	B 1.03 What is the respondent's age in years?		. >= 1	Must be a positive integer!
41	member_marital_status	select_one marital	yes	B 1.04 What is the respondent's civil or marital status?			
42	member_literacy	select_one yes_no	yes	B 1.05 Can the respondent read and write in either English, the local language, or both?			
43	member_attended_school	select_one yes_no	yes	B 1.06 Has the respondent ever attended school?			
44	member_highest_school	select_one school	yes	B 1.06a What is the highest qualification completed by the respondent?	\${member_attended_school} = '1'		

Variable  
Name

Question  
Type

Question  
Appearance

Skip  
Logic

# Form rendered by Enketo

- Using “grid” theme
- Uses Google Chrome webbrowser
  - Can be filled out on Android, iOS, PC, etc...
- Questions with “skip logic” only appear when relevant answers marked on preceding questions
  - i.e. highest education completed only displayed if “Has the respondent ever attended school” marked as “yes”

## Household Demographics

<b>NOTE TO ENUMERATOR:</b> ALL APPLICABLE QUESTIONNAIRE SECTIONS SHOULD BE ASKED OF THE HEAD OF HOUSEHOLD AND SENIORMOST GENDER-OPPOSITE HOUSEHOLD MEMBER AS SEPARATE SURVEY ENTRIES.			
<b>B 1.01 IS THE RESPONDENT THE HEAD OF HOUSEHOLD, OR THE GENDER-OPPOSITE SENIORMOST* HOUSEHOLD MEMBER?</b>  <input type="radio"/> Head of Household <input type="radio"/> Gender-Opposite Seniormost Member  <small>Required</small>		<b>B 1.02 WHAT IS THE RESPONDENT'S GENDER? *</b>  <input type="radio"/> Male <input type="radio"/> Female	
<b>B 1.03 WHAT IS THE RESPONDENT'S AGE IN YEARS? *</b>	<b>B 1.04 WHAT IS THE RESPONDENT'S CIVIL OR MARITAL STATUS? *</b>  <input type="radio"/> Never married / Single <input type="radio"/> Informal / Consensual union / living together <input type="radio"/> Married <input type="radio"/> Separated <input type="radio"/> Divorced <input type="radio"/> Widowed	<b>B 1.05 CAN THE RESPONDENT* READ AND WRITE IN EITHER ENGLISH, THE LOCAL LANGUAGE, OR BOTH?</b>  <input type="radio"/> Yes <input type="radio"/> No	<b>B 1.06 HAS THE RESPONDENT* EVER ATTENDED SCHOOL?</b>  <input type="radio"/> Yes <input type="radio"/> No

# KoBoToolbox Data Aggregation

member_type	member_gender	member_age_input	member_marital_status	member_literacy	member_attended_school	member_highest_school
2	2	62	3	2	2	
1	2	52	5	2	1	16
1	1	51	3	2	2	
2	1	51	3	1	1	10
2	2	33	3	2	1	16
1	1	62	3	1	1	7
2	2	81	6	1	2	

- Rows represent respondents
- Columns named from XLSForm
- Answers are coded as specified in form
- Skipped questions are left as blank cells

Data is exportable as several common file formats, including CSV and XLS

# Paperless-Specific Logistics and Training



Source: Daven Amin



# Paperless-Specific Logistics and Training

- Additional training time required to educate enumerators
  - Locating sampling sites to collect responses
  - Recording sampling site location in survey form
    - Enketo can record GPS coordinates of device, but this is not equivalent to recording the INTENDED sampling site
  - Input lag associated with Enketo software (depends on device)
- Additional logistics for using tablets in the field
  - Devices must be charged on a fluctuating power grid
  - Power banks provided to extend tablet battery life
  - SIM cards for several providers issued to enumerators to account for varying cell coverage areas

# Field Supervision Aids

shinyapps.io

Powered by  R Studio

SFMP Baseline Diagnostics

Time Plot

Location Plot

Generate plot between these dates:

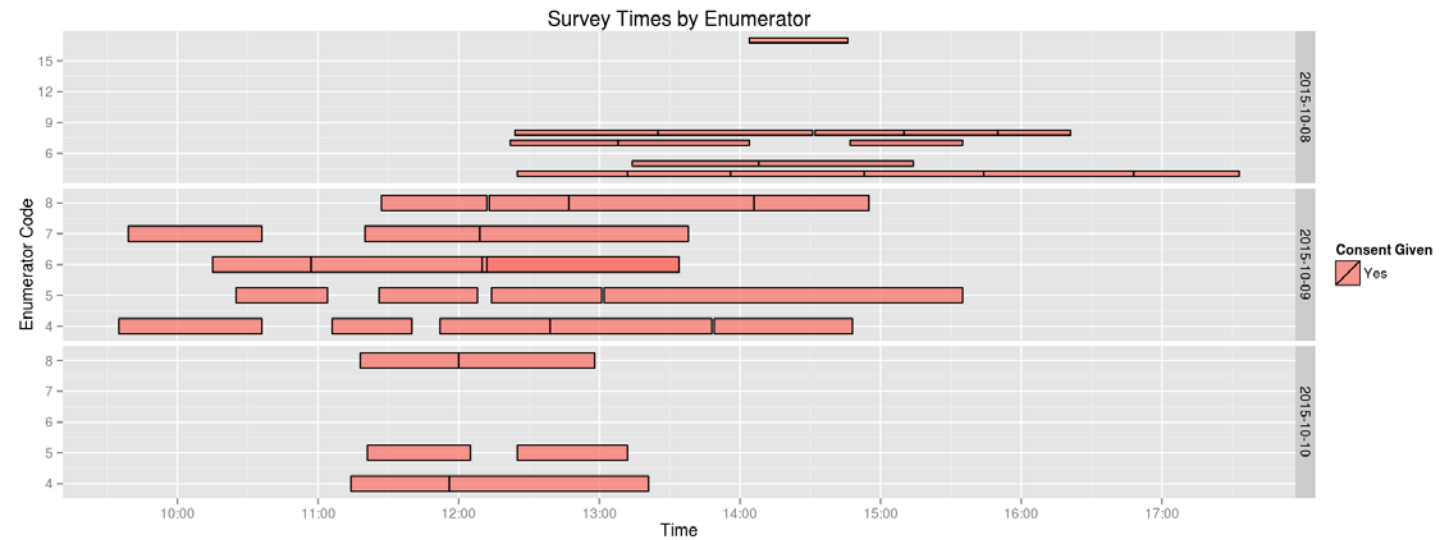
08/10/15

to

10/10/15

Plot

Table



# Field Supervision Aids

Generate plot between these dates:

08/10/15

to

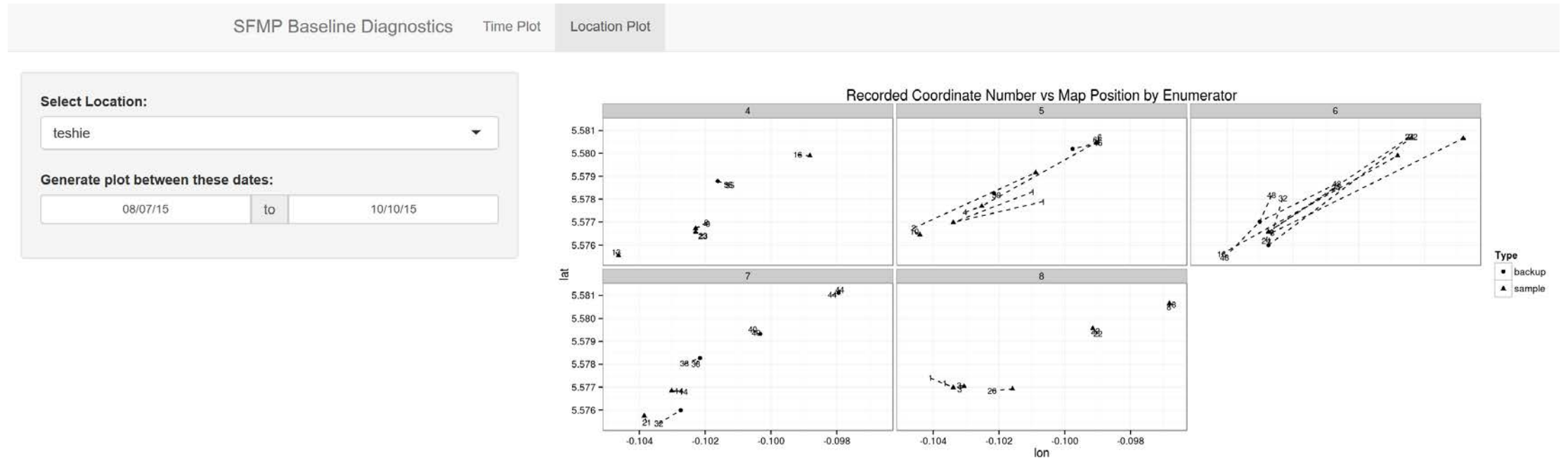
10/10/15

Plot

Table

	Enumerator	Mean Time per Survey (minutes)	Standard Deviation (minutes)
1	4	54.28	13.41
2	5	61.39	38.00
3	6	66.11	21.60
4	7	57.30	15.81
5	8	49.39	14.84
6	17	42.13	

# Field Supervision Aids



# Final Takeaways

- Paperless surveys are efficient!
  - Minimize data entry errors
  - Catching inconsistencies between enumerators
  - Optimizing data quality
- Use of tablets allow for easier GIS sampling
  - GPS radios built into modern tablets
    - Accuracy is acceptable for household surveys
- Tablets can record additional metadata
  - Start time, stop time, and device ID can be logged

Thank you!



Thank you!